
8. BYCATCH

There have been a few important studies evaluating methods to reduce bycatch and bycatch mortality in 2000. NMFS took a major step towards reducing bycatch in the pelagic longline fishery through development of Regulatory Amendment One to the HMS FMP and implementing regulations to close large areas and require gear modifications where bycatch rates have historically been high. In addition, circle hooks have emerged as a voluntary measure recreational fishermen have chosen to increase survival of released tunas and billfish. Bycatch information relevant to each HMS gear type has already been discussed in previous sections of this document. In addition to bycatch of HMS and other species by fishermen targeting HMS, there is the issue of HMS as bycatch in other fisheries as well as the “incidental catch” of marine mammals. The Magnuson-Stevens Act refers only to finfish and sea turtles as bycatch. As a result, other species such as sea birds and marine mammals are considered “incidental catch.” As bycatch tends to occur in fisheries that operate across jurisdictional boundaries, governing bodies, and legal statutes, bycatch reduction often becomes a complex issue.

8.1 Comprehensive Bycatch Reduction Strategy

The NMFS HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Details on bycatch and bycatch reduction measures can be found in Section 3.5 of the HMS FMP and in Regulatory Amendment One to the HMS FMP (NMFS, 2000a).

Bycatch Reporting Methodology

NMFS utilizes self-reported data (pelagic logbook program), at-sea observer data, and survey data (recreational fishery dockside and telephone surveys) to produce bycatch estimates. These data are collected with respect to fishing gear type and have been presented by gear type in this report in prior sections. The number and location of discarded fish are recorded, as is the disposition of the fish, i.e., alive vs. dead. Post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow.

In addition to existing programs in the commercial and recreational HMS fisheries, NMFS implemented a final action in the HMS FMP to place observers on charter/headboat vessels whose owners volunteer for the program (Section 3.8.1). As with charter/headboats, NMFS has the authority to use observers to collect bycatch information from Harpoon, Purse Seine, Angling, and General category vessels fishing for tunas. Before these vessels can be selected for catch, bycatch, and effort reporting, a suitable report form must be developed for these gears. To address this in 2000, NMFS completed an analysis of participation in Federal logbook programs coastwide (Northeast, Southeast, and Gulf of Mexico) to determine the "gaps" in HMS catch and

effort information. Furthermore, the compatibility of logbook programs and forms already in place is being evaluated to determine if expanding an existing logbook program would meet HMS management needs, or if a completely new program and/or forms would be required.

Annually, NMFS submits data (Task I) to ICCAT on mortality estimates (dead discards). These data are used annually and included in the SAFE report to evaluate bycatch trends in HMS fisheries. NMFS collects bycatch data from the dockside survey for rod and reel fishermen and uses these data (from LPS) to estimate bluefin tuna dead discards. However, bluefin and yellowfin tuna are currently the only species for which expanded estimates are currently made from the LPS. Statistical problems associated with small sample size remain an obstacle to estimating bycatch in the rod and reel fishery, however NMFS is addressing these problems.

Marine Mammals

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean sea. The *draft* stock assessment reports are typically published around January and final reports are typically published in the Fall. Final stock assessment reports for 2000 will be available soon. The draft 2001 reports are expected in Spring 2001; the proposed 2001 MMPA List of Fisheries published in January 2001.

NMFS continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NMFS held a joint meeting of the three regional scientific review groups to further discuss the issue. Although serious injury guidelines have not been published, NMFS will apply the criteria listed by the review groups to make determinations for specific fisheries.

At a recent sub-group meeting of the Atlantic States Marine Fisheries Commission, NMFS and state agency staff discussed the need for collecting information about protected species bycatch in recreational fisheries. The sub-group recommended that agencies should investigate options for quantifying interactions between recreational gear. The impetus for the recommendation was based on the perception that there may be an increasing problem of interactions (i.e., entanglements) between recreational fishing gear and marine mammals, particularly harbor porpoise and bottlenose dolphin. Although stranding data are preliminary, there is some evidence of protected species entanglements (primarily bottlenose dolphin) with recreational fishing gear (primarily monofilament line and fishing lures). Neither states nor NMFS have any directed monitoring program to identify recreational fishing interactions with protected species. The high number of recreational fishing participants, combined with the low probability of encountering a protected species, makes direct observation through an at-sea observer program immensely difficult and costly, with little return. However, there have been discussions about several efforts that may help to identify “hot spots” of recreational fishing/protected species interactions.

Sea Turtles

NMFS took steps in 2000 to finalize serious injury guidelines for sea turtles entangled in fishing gear. Those guidelines are being revised and will be available to the public in early 2001. On October 13, 2000, NMFS published an emergency rule (65 FR 60889) implementing a 180-day closure in the Grand Banks area, and requiring the use of line clippers and dipnets to reduce bycatch mortality of incidentally caught sea turtles in the pelagic longline fishery. NMFS also funded a project in the Azores studying turtle injuries and mortalities and gear modifications. NMFS expects the final report on that project in January 2001. These actions could have significant impacts on the management and operation of the pelagic longline fishery. The guidelines are also likely to affect any HMS fishery that interacts with sea turtles, including the bottom longline fishery and shark drift gillnet fishery.

Sea Birds

The National Plan of Action for sea birds is currently being finalized. The HMS Division will meet with longline fishery participants and other members of the public in the future to discuss possibilities for complying with the intent of the plan of action. Because takes appear to be relatively low in the pelagic longline fishery, adoption of immediate measures is unlikely.

A Workshop on Seabird Incidental Catch in the Waters of Arctic Countries was held in Canada in April 2000, and ICCAT was represented at that meeting. This workshop was the first formal opportunity for different stakeholders to gather and discuss the incidental catch of seabird issue since the FAO's approval of the *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* (IPOA-Seabirds), a voluntary instrument of the FAO. The workshop concluded that cooperation, collaboration and communication among scientists, managers, fishers and conservationists are considered to be essential. The importance of long-term seabird population monitoring and bycatch assessment was emphasized in order to document species composition and mortality, assess population level impacts and evaluate improvements in mitigation methods. Seabird incidental take in tuna longline fisheries appears not to be a substantial issue, though this does not preclude the collection of data through Observer programs. The United States continues to support ICCAT's interest in sea bird bycatch in international longline fisheries. The ICCAT sub-Committee on bycatch noted that it continues to recommend that ICCAT member nations collect bycatch information on seabirds and other species taken coincident to fishery effort directed at Atlantic tunas and tuna-like species to quantify the overall level of interactions.

8.2 Bycatch of Highly Migratory Species in Other Fisheries

NMFS is concerned about bycatch mortality of Atlantic HMS in any federal or state-managed fishery which captures them. NMFS plans to address bycatch of these species in the appropriate FMPs. For example, capture of swordfish and tunas incidental to squid trawl

operations is to be addressed in the Squid, Mackerel, and Butterfish FMP. Capture rates of tunas in coastal gillnet fisheries are being explored through issuance of exempted fishing permits and reporting requirements. NMFS continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection divisions. NMFS supports development of an interstate plan for coastal sharks by the Atlantic States Marine Fisheries Commission which would support protection of sharks caught incidentally by state-managed fisheries.

Squid Mid-Water Trawl

U.S. squid trawl fishermen landed 14.2 mt of Atlantic HMS in 1999 (Table 8.1) incidental to the squid, mackerel, and butterfish trawl fishery (NMFS, 2000b). Landings were increased over 1998 landings for every HMS encountered, except albacore tuna. These fishermen, using mid-water gear, landed yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish as incidental to target species. Landed fish are counted through the dealer report program and by using information collected from tally sheets. In addition, squid trawl fishermen are required to report landings in the Large Pelagic Logbook or in the Multi-species Logbook. Bycatch of HMS in this fishery is not well-documented and NMFS has requested funding for auxiliary observer coverage in this fishery to document bycatch rates of HMS in 2001. A retention limit of five swordfish per trip allows squid trawl fishermen with swordfish limited access permits to land some of the swordfish that are encountered, although regulatory discards still occur. NMFS continues to work with squid fishermen through the existing observer program to reduce bycatch.

Table 8.1 **Atlantic HMS Landed Incidental to Squid Trawl Fishing Operations in 1998-1999.** Data based on tally sheets submitted to NMFS (NMFS, 2000b).

| Species | 1998 (mt ww) | 1999 |
|----------------|--------------|-------------|
| Yellowfin tuna | 0.7 | 7.5 |
| Skipjack Tuna | 0.2 | 1.0 |
| Bigeye Tuna | 0.5 | 1.2 |
| Albacore | 2.4 | 0.4 |
| Swordfish | 5.9 | 7.5 |
| Total | 9.7 | 14.2 |

Menhaden Purse Seine

A recent NMFS-funded study concluded a profile of shark bycatch in the menhaden purse seine fishery. Sharks were caught incidentally in approximately 30 percent of the purse seine sets. Blacktip sharks were the numerically dominant species. An estimated 30,000 sharks are taken in this fishery annually (deSilva, Condrey, and Thompson, 2000).

Industry workers in this fishery employ a fish excluder device to reduce the retention of sharks and other large species (Rester and Condrey, 1999). In addition, a recently introduced hose cage modification may prove to be effective in reducing shark bycatch. These devices vary in effectiveness and no standards exist for such bycatch reduction measures in this fishery. In addition, there are currently no reporting requirements for takes of sharks in the menhaden purse seine fishery.

Shrimp Trawl Fishery

Shark bycatch in the shrimp trawl fishery consists mainly of sharks too small to be highly valued in the commercial market. As a result, few sharks are retained. The magnitude of this bycatch, however, is not considered in the most recent LCS assessment. In general, requirements for turtle excluder devices in this fishery have probably resulted in less bycatch; sharks are physically excluded from entering the gear. The upcoming SCS assessment, to be completed in 2001, will include estimates of SCS bycatch which are expected to greatly exceed the magnitude of the landings themselves (E. Cortes, NMFS, Panama City, FL, pers. comm.).

Summary

Although bycatch of swordfish and tunas in the squid trawl fishery is substantial, Atlantic shark bycatch in non-HMS fisheries is a greater concern. Nearly 12 percent (approximately 40,600) of the LCS coastal sharks accounted for in the 1998 shark evaluation workshop models were bycatch in the menhaden fishery, the longline fishery, and other coastal fisheries in the Gulf of Mexico and South Atlantic. The stock assessment models do not account for shark bycatch mortality associated with mid-Atlantic (north of North Carolina) or New England fisheries. Further, bycatch of SCS in non-HMS fisheries is expected to greatly exceed landings for 2000. NMFS will consider options for minimizing bycatch of SCS in other fisheries after the 2001 assessment is completed. Although the HMS FMP requires counting dead discards against Atlantic shark quotas, this management measure is currently not in force per a settlement agreement.

8.3 Evaluation of Bycatch Reduction Measures

The following section provides a review current management measures:

- Reduce length of longline to increase survival of mammals:

NMFS is not able to evaluate the effectiveness of this measure at this time as the data have not yet been prepared for analysis.

- Close area in June to decrease bluefin tuna bycatch in the pelagic longline fishery:

The number of bluefin tuna landed and discarded by month and year is reported in the pelagic logbook. The following tables (Table 8.2 and Table 8.3) provide an enumeration of logbook submissions of the disposition of bluefin tuna catches (kept, discarded dead, discarded alive). Caution should be exercised in utilizing these data to determine the effectiveness of the June closure that went into effect during 1999 as a result of implementing the HMS consolidated regulations (May 28, 1999; 64 FR 29090). This information also does not consider the pooling method utilized to report catch to ICCAT. In Table 8.2, the rows designated as “closed” represent the area in the Northeast/Mid-Atlantic Bight closed to pelagic longline fishing during the month of June. “Open” represents all other areas in the Atlantic Ocean.

Table 8.2. Number of bluefin tuna (BFT) reported in the pelagic logbook program as kept, discarded dead, or discarded alive.

| Month | Area | BFT kept | | | BFT discarded dead | | | BFT discarded alive | | |
|--------------|-------------|-----------------|------|------|---------------------------|------|------|----------------------------|------|------|
| | | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 |
| Jan | Closed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Open | 18 | 9 | 19 | 5 | 15 | 3 | 5 | 35 | 8 |
| Feb | Closed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Open | 10 | 10 | 24 | 1 | 11 | 7 | 12 | 14 | 9 |
| Mar | Closed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Open | 23 | 17 | 31 | 4 | 14 | 13 | 9 | 51 | 27 |
| Apr | Closed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Open | 4 | 14 | 39 | 2 | 6 | 50 | 6 | 17 | 39 |
| May | Closed | 1 | 1 | 1 | 2 | 1 | 2 | 4 | 1 | 20 |
| | Open | 21 | 23 | 25 | 18 | 21 | 42 | 26 | 33 | 94 |
| June | Closed | 14 | 10 | 0 | 144 | 156 | 0 | 159 | 278 | 0 |
| | Open | 29 | 25 | 29 | 56 | 182 | 87 | 42 | 194 | 124 |
| July | Closed | 3 | 13 | 7 | 3 | 32 | 2 | 15 | 53 | 6 |
| | Open | 35 | 30 | 11 | 32 | 20 | 5 | 57 | 35 | 12 |
| Aug | Closed | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Open | 23 | 6 | 9 | 1 | 2 | 1 | 5 | 2 | 0 |
| Sept | Closed | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Month | Area | BFT kept | | | BFT discarded dead | | | BFT discarded alive | | |

| | | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 |
|-------|--------|------|------|------|------|------|------|------|------|------|
| | Open | 12 | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 0 |
| Oct | Closed | 0 | 7 | 6 | 0 | 9 | 0 | 1 | 30 | 2 |
| | Open | 9 | 25 | 12 | 0 | 0 | 0 | 0 | 1 | 0 |
| Nov | Closed | 7 | 10 | 2 | 7 | 14 | 1 | 6 | 20 | 0 |
| | Open | 5 | 11 | 9 | 0 | 11 | 1 | 7 | 33 | 1 |
| Dec | Closed | 10 | 1 | 2 | 22 | 3 | 1 | 39 | 0 | 0 |
| | Open | 10 | 16 | 15 | 14 | 4 | 5 | 11 | 6 | 45 |
| Total | | 234 | 232 | 243 | 311 | 502 | 221 | 404 | 807 | 387 |

Catch patterns of other target species and bycatch by pelagic longline gear are also presented by pooling the number of fish landed and discarded by month as reported in the pelagic logbook. The portion of Table 8.3 designated as “Closed” represents the area in the Northeast/Mid-Atlantic bight that is closed in June but the number represents those fish caught in that area for the entire year; “Open” represents all other areas of the Atlantic Ocean fished by U.S.-flagged pelagic longline vessels. “Discarded” is both discarded dead and discarded alive.

Table 8.3. Number of bluefin tuna, sharks, billfish, tunas and swordfish kept and discarded inside and outside of the June, Northeast/Mid-Atlantic Bight.

| Species | Closed area | | | Open area | | |
|---------------------|-------------|--------|--------|-----------|--------|--------|
| | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 |
| BFT kept | 35 | 42 | 20 | 199 | 190 | 223 |
| BFT discarded | 402 | 597 | 35 | 313 | 712 | 573 |
| Swordfish kept | 2,075 | 3,315 | 1,329 | 67,000 | 66,000 | 63,000 |
| Swordfish discarded | 1,089 | 1,469 | 874 | 19,810 | 21,175 | 19,308 |
| Tunas kept | 11,644 | 10,977 | 14,214 | 97,323 | 68,243 | 88,178 |
| Tunas discarded | 490 | 363 | 680 | 4,476 | 5,957 | 3,831 |
| Pelagic sharks kept | 401 | 368 | 271 | 4,834 | 3,388 | 2,543 |

| Species | Closed area | | | Open area | | |
|--------------------------|-------------|--------|-------|-----------|--------|--------|
| | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 |
| Pelagic sharks discarded | 16,672 | 12,486 | 4,858 | 66,108 | 32,126 | 24,082 |
| LCS kept | 1,734 | 816 | 1,030 | 25,500 | 11,492 | 12,024 |
| LCS discarded | 82 | 58 | 77 | 8,300 | 6,047 | 6,193 |
| Billfish discarded | 333 | 96 | 388 | 7,385 | 3,670 | 4,400 |
| Turtle interactions | 12 | 23 | 35 | 255 | 898 | 593 |

- Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations:

Observers were placed on shark drift gillnet vessels during right whale season off the East Coast of Florida between Fort Pierce and West Palm Beach (Carlson, 2000) and covered 12 strikenet and 40 drift gillnet sets made during right whale season. No marine mammals (bottlenose dolphin and spotted dolphin) were observed caught and discarded dead. No large whales were encountered by this gear during right whale season (November 15- March 31, 1999).

- MMPA List of Fisheries Update/Stock Assessment:

NMFS continues to update the MMPA List of Fisheries and the 2000 final list is now available. Check out the Office of Protected Species webpage (http://www.nmfs.noaa.gov/prot_res/prot_res.html) or call Emily Hanson at 301-713-2322 for a copy of the draft 2000 stock assessment report for the Atlantic species.

- Meeting of the Atlantic Offshore Cetacean Take Reduction Team (AOCTRT)/Future Plans:

NMFS Office of Protected Resources hopes to reconvene the AOCTRT in 2001 to review new data for the pelagic longline fishery and to discuss additional take reduction measures in fisheries that interact with pilot whales (e.g. pelagic longline, monkfish gillnet, squid trawl, etc.). There were no meetings of this group in 2000 due to funding constraints.

- Observer coverage of shark gillnet fleet and pelagic longline fleet:

Due to the high costs of these observer programs and limited funding, NMFS is

considering requiring VMS in the shark gillnet fishery and will continue baseline coverage of both the shark gillnet fishery and the pelagic longline fishery using funds appropriated for the observer program for FY2001.

8.4 Recommendations to Reduce Bycatch

In 1998, NMFS published a National Bycatch Plan (NOAA, 1998). The plan recommended numerous actions to address bycatch mortality. Table 8.4 lists the recommendations and actions taken by NMFS thus far to address these issues.

Table 8.4 Recommendations for Addressing Bycatch Mortality in HMS Fisheries and Actions Planned or Taken to Address These Recommendations.

| Recommendation | 1999 Actions | 2000 Actions | Expected Actions for 2001 |
|---|--|--|---|
| Improve data on the character and magnitude of bycatch to allow quantitative estimates of discards in the fisheries for use in stock assessments and making management decisions. | Pursued submission of bycatch data by ICCAT countries for analyses to develop measures to reduce small swordfish bycatch stock-wide. | Research into estimating discard rates and volumes based on direct observations by scientific fishery observers was also continued. | Independent review of methodology used to estimate bluefin tuna dead discards. |
| Improve gear-handling techniques to reduce mortality. | Educational workshops for recreational and commercial fishermen. | Distributed handling protocols for marine mammals and sea turtles | Hold pelagic longline gear workshop in Jan. 2001 Require line clippers and dipnets |
| Conduct research on gear-deployment methods that will reduce interactions between and mortality of protected species that encounter fishing gear. | Transfer funding for gear development at NSIL | Funded a circle hook study in the Azores Developed a dipnet and line cutter that would decrease injuries to turtles; these devices required as of Nov. 2000 on all pelagic longline vessels Development of revised design of lightsticks that don't attract turtles, other gear modifications (NSIL, 2000) | Pelagic longline gear workshop |

| Recommendation | 1999 Actions | 2000 Actions | Expected Actions for 2001 |
|---|---|--|---|
| Work cooperatively with the fishing industry to transfer new knowledge and techniques between fishermen and researchers. | | Educational workshops include research results on the agenda. Cooperative research with pelagic longline industry members to explore lightstick color and design effects on turtle hooking rates | NMFS to host Jan. 2001 gear workshop |
| Reduce bycatch and bycatch mortality of undersized swordfish and tunas. | Proposed closure of critical swordfish nursery areas | Closed critical swordfish nursery areas to pelagic longline fishing (Am. 1 to HMS FMP) | Educational workshop for recreational fishermen at Miami International Boat Show in Feb. 2001. |
| Improve knowledge of (1) basic biology and stock status of shark species in the Northwest Atlantic and (2) the effects of bycatch mortality on shark populations. | NMFS funded research includes: <ul style="list-style-type: none"> Center for shark research at Mote Marine Lab: shark biology, FY98 Univ of MI: shark nursery grounds, FY98 Gulf and South Atlantic Fishery Development Foundation: observer program and biology, FY98 COASTSPAN: a study to identify shark nursery areas, FY 98 Participation in pelagic shark assessment in February, 2000. | NMFS developed a draft National Plan of Action for Sharks commensurate with the FAO International Plan of Action for Sharks to assess direct and indirect shark fisheries, stock status, and promote more effective and sustainable shark management. Refer to Sections 2 and 4 for description of NMFS-funded projects ICCAT Bycatch sub-committee recommended that SCRS conduct shark assessments in 2002. | Final Shark NPOA LCS Assessment SCS Assessment Continuation of shark research programs |
| Increase research on the role of apex predators in structuring marine ecosystems, and assess the effects of bycatch of these stocks. | NMFS funds COASTSPAN, a study to identify shark nursery areas. NMFS includes bycatch data in shark assessment | NMFS funds COASTSPAN, a study to identify shark nursery areas. | NMFS to include bycatch data in small coastal shark assessment Continue COASTSPAN program |

| Recommendation | 1999 Actions | 2000 Actions | Expected Actions for 2001 |
|---|---|---|---|
| Reduce mortality and bycatch mortality of billfish captured in the directed fisheries for Atlantic HMS. | | Time/area closures in the South Atlantic Bight and Gulf of Mexico; encourage the voluntary use of circle hooks; live bait prohibition in Gulf of Mexico; funded circle hook research in longline fishery (Faltermann and Graves, 2000); conducted recreational circle hook research by NMFS scientists (Prince, Venizelos, and Ortiz, 2000) | |
| Determine the status of sailfish populations. | | | No final timeline established to date |
| Conduct research on post-release mortality of recreationally-caught billfish, tunas, and sharks. | Research being funded by NMFS includes: <ul style="list-style-type: none"> MA Div. Marine Fisheries: Effects of Hook Design, FY98 Bluefin tuna tagging Sponsored Catch and Release Conference in Nov. 1999 to share data on this topic, identify further research needs | Refer to research section for information on NMFS-funded tagging programs | |
| Improve data collection and monitoring of the recreational tuna, shark, and billfish fisheries. | New voluntary Charter/Headboat observer program and logbook program Increased tournament registration and reporting. | Increased enforcement of tournament reporting and registration requirements | Consider options for new monitoring system for recreational billfish and swordfish landings |

* Because stock assessments are conducted internationally by SCRS, NMFS does not produce domestic stock assessments for ICCAT species. However, NMFS has developed overfishing criteria based on the most recent assessment (1993) and has determined that West Atlantic sailfish are overfished and overfishing continues to occur.

8.5 Summary

It is difficult to compare fishing gears due to the differences in areas and seasons fished. Table 8.5 summarizes the total percentage of mortality attributed to bycatch for Atlantic HMS.

Table 8.5 Percent of Stock-Wide Mortality Attributed to U.S Bycatch for HMS Stocks in 1998-1999 by weight (unless stated otherwise; Reported discards/total landings + discards)*. Sources: SCRS, 1999, 2000; Cortes, 1999 (sharks only).

| Species/Stock | Percent of Mortality Attributed to Bycatch in 1998 | Percent of Mortality Attributed to Bycatch in 1999 |
|-----------------------------|--|--|
| North Atlantic Swordfish | 4% | 4% |
| South Atlantic Swordfish | less than 0.1% | less than 0.1% |
| West Atlantic Bluefin Tuna* | 4% | 5.4% |
| Large Coastal Sharks** | 10.5% (by number)*** | 15% (by number)*** |
| Pelagic Sharks** | 30.5% (by number)**** | 16.2% (by number)**** |
| Small Coastal Sharks** | Unknown | In preparation***** |
| North Atlantic Blue Marlin | 4% | 7% |
| North Atlantic White Marlin | 10% | 18% |
| Sailfish | 3% | 13% |
| Spearfish | 0% | 0% |

*Based on the landings and discards reported to ICCAT for stocks fished on by U.S. fishermen. It should be noted that discards of BAYS tunas to ICCAT are generally not reported.

**There is no international estimate of total landings or discards of sharks, the percentages therefore reflect the U.S. mortality due to bycatch.

***Cortes, 2000

****Recreational landings estimates from Cortes 2000; commercial estimates from Cortes 2000 and Cramer 1999 and 2000. For the commercial landings estimates, the commercial landings (in lbs dw) from Cortes 2000 were divided by the average sizes for pelagic and blue sharks for 1998 and 1999 from Cramer 1999 and 2000, respectively, to generate commercial landings by number. The number of dead discards for pelagic blue sharks for 1998 and 1999 were from Cramer 1999 and 2000, respectively.

*****A stock assessment for SCS will be conducted in 2001, which will include bycatch estimates

In Table 3.47 of the HMS FMP, NMFS identified the significance of bycatch of certain species in various HMS fisheries. Table 8.6 below indicates action NMFS has taken to address those issues and reduce bycatch.

Table 8.6 Addressing Significant Bycatch Concerns in HMS Fisheries

| Gear | Significant Bycatch Species | Action Planned or Taken |
|------------------|---|--|
| Pelagic Longline | <ul style="list-style-type: none"> • bluefin tuna • undersized target species • mammals • sea turtles | <ul style="list-style-type: none"> • Closed areas in Mid-Atlantic bight in June; South Atlantic Bight area year-round, Charleston Bump Feb-April; DeSoto Canyon year-round; Grand Banks area temporarily closed • Gear modifications, educational workshops • Move after one entanglement |
| Bottom Longline | <ul style="list-style-type: none"> • undersized target • prohibited shark species | Note: Due to a court injunction, minimum sizes are not in effect in the commercial fishery. |
| Shark Gillnet | <ul style="list-style-type: none"> • undersized target • protected species • prohibited shark species | <ul style="list-style-type: none"> • Observer coverage to collect necessary data • Proposed VMS requirement during right whale season • Closed area to drift gillnets (strickenets only) |

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